Grocery Shopping *with a* Wireless PDA

Shoppers like prototype software's assistance in finding items and specials.

by JANE M. SANDERS

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Someday soon grocery shoppers using a wireless personal digital assistant (PDA) may be able to interact with a store's computer system to locate items and learn about special promotions.

In a field test of a prototype PDA system developed by Georgia Institute of Technology researchers, shoppers reported that the device made shopping easier and more efficient. Shoppers tended to avoid impulse buys and also found items in the store more quickly. On the down side, shoppers did not like holding the PDA while shopping, and many suggested a docking station on the shopping cart – an idea explored, but not tested in this study.

"It's still an unanswered question as to whether the PDA is the right device for use in grocery stores," says Georgia Tech Associate Professor of Computing John Stasko, who supervised the project. "Our study clearly showed some potential. But the devil is in the details."

Stasko's former students Erica Newcomb and Toni Pashley, who graduated with master's degrees last year, presented the details in a paper presentation titled "Mobile Computing in the Retail Arena" on April 9 at the Computer-Human Interaction (CHI) 2003 meeting in Fort Lauderdale, Fla.

Grocery shoppers may soon be able to discard paper lists and use a wireless PDA to assist with their purchases.

PHOTO BY GARY MEEK

Georgia Tech researchers Erica Newcomb (left), John Stasko (center) and Toni Pashley created a prototype PDA system that makes grocery shopping easier and more efficient, according to shoppers who have tested it.

The study, funded in part by NCR, involved extensive background research — including observation of and interviews with shoppers and a shopping survey – before designing and testing a prototype in a Kroger store in Atlanta.

From their research, Pashley and Newcomb created a scenario that could be implemented now and offers many of the features shoppers want. In the scenario, the local grocery store contains an always-on information system. The shopper, who is a member of the local grocery store's frequent shoppers club, is immediately recognized upon entering the store. The shopper either brings a PDA-stored list from home or receives one from the store based on previous purchases.

Once the shopper enters the store, the list is reordered to provide the most efficient route to obtain every item on the list. Shoppers check off items as they acquire them, review and add specials to the list, view and save recipes and watch for in-store specials.

Upon checkout the shopper scans the grocery items, and the system compares the original list with items that have been scanned. An updated "scanned" list is beamed to the PDA allowing the shopper to verify the total of the grocery bill. When satisfied with the purchases, the shopper can beam the verified list along with payment information to the checkout. A receipt is beamed back to the PDA for the shopper to later reconcile with a checking account.

The researchers then used features from the idealized scenario to build a prototype software system that put the grocery list in the center of the PDA screen and devoted the top of the screen to a store layout. The revolving promotional area was placed at the bottom of the screen. The prototype was built using Macromedia Flash for Microsoft Pocket PC Version 3.0.1. The handheld was a Compaq IPAQ with a color display.

Five users tested the prototype in a Kroger store in Atlanta. Researchers Pashley and Newcomb gave them a series of tasks – for example, find milk, eggs and bread – requiring use of various system features, and then observed and audiotaped the users as they shopped with the PDA. Afterwards, they interviewed them.

"It was generally well received," Stasko said. Participants appreciated the system's ability to identify the location of items in the store, which was probably the most-used feature of the interface, Pashley and Newcomb report.

Participants commented on how quickly they shopped, how focused they were on the shopping list and how they did not feel like they browsed while shopping. One participant said he is usually "all over the store." The PDA interface helped him "move orderly through the store," and that, with the list on the application, he did not "even want to look around." He "just wanted to go grab the item on the list."

The researchers noted, "While this might not be good news for the grocery stores, quick and efficient shopping was stated as one of the most desired grocery shopping traits in the survey we conducted."

Meanwhile, participants in the study also commented on the difficulty of holding the PDA while using their hands to shop. Following the Kroger experiment, Pashley and Newcomb designed a PDA system that was mounted on a shopping cart. That design was created as a class assignment, though, and was not tested in this study.

IMAGE COURTESY OF JOHN STASKO

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Despite this drawback, two participants called after the field test to ask when they could buy the system. "But this system was very much a prototype," Stasko explained. "It's nowhere near a production-quality system."

For now, no further studies are planned for the system, but Stasko is hopeful some of his other students will continue the research. Issues to explore include "whether users would use their own PDA and if so how it would integrate with the grocery store's software system," Stasko said. "In another model, the store gives shoppers a PDA to use while shopping, but then there's the concern about theft. And there are also serious privacy concerns, particularly related to the frequent shopper cards."

IMAGE COURTESY OF JOHN STASKO

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Researchers believe their prototype might be tweaked for use in other retail domains, including discount department and home improvement stores. Because shoppers are usually less familiar with these types of stores, the task of finding items would become paramount for the PDA application, Stasko added.

Several other shopping aids have been researched elsewhere. They include Easi-Order, a PDA application for creating a shopping list at home and then sending it to the store. It was launched in Safeway stores in the United Kingdom. Klever-Kart is an on-cart device that offers users information on sales, nutrition, news and weather. And Shoppers Eye is a research concept that has mall shoppers carrying a wireless PDA to share their list with stores that make bids for the user's business.

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■ For more information, contact John Stasko, College of Computing, Georgia Tech, Atlanta, GA 30332-0280. (Telephone: 404-894-5617) (E-mail: john.stasko@cc.gatech.edu).